

REMARKS/ARGUMENTS

Claims 21-30, 34, and 35 are pending the Application. Claims 21-24, 26-30, 34, and 35 stand rejected by the pending Office Action. Claim 25 stands objected to as being dependent on a rejected claim, but has been identified as being directed to allowable subject matter. The Applicant appreciates this indication of allowable subject matter.

I. Paragraph 3 Rejection of Claims 21-24, 29, 30, 34, and 35

Claims 21-24, 29, 30, 34, and 35 stand rejected under 35 U.S.C. § 103(a) as being assertedly unpatentable over Catanzarite, U.S. Patent No. 5,652,704 ("Catanzarite") in view of Arsem, U.S. Patent No. 3,559,027 ("Arsem"). The Applicant respectfully traverses this rejection.

A. Claims 21 and 29

Claim 21 recites an isolation system that comprises a magnetorheological (MR) damping system that includes an MR damper, a damper controller including a rechargeable power supply and a recharging arrangement in electrical communication with the rechargeable power supply. The recharging arrangement comprises at least one piezoelectric generator adapted for converting vibratory motion to electrical energy for storage in the rechargeable power supply.

The Applicant respectfully submits that one of ordinary skill in the art would have no reason to combine the teachings of the Catanzarite and Arsem patents and, even if one did combine these teachings, they would not suggest the features of claim 21 or render these features obvious.

As a general matter, the Applicant submits that the Catanzarite and Arsem patents do not disclose any form of self-powered damping system. Catanzarite discloses a damping system that requires a power source, but it does not disclose or suggest the inclusion of any form of recharging arrangement. Arsem discloses a mechanism for converting vibration to electrical energy that may include a piezoelectric generator. It does not, however, disclose or suggest a powered damping system that could make use of the electricity generated by a piezoelectric generator.

In the present Office Action, it was conceded that Catanzarite fails to disclose the recharging arrangement recited in Claim 21. It was asserted, however, that “it would have been obvious . . . to have constructed the recharging arrangement of Catanzarite to include a piezoelectric generator as taught by Arsem.” Office Action, at 3.¹ The Applicant respectfully points out that there is no disclosure of a recharging arrangement in Catanzarite. Catanzarite discloses “a battery or similar source of current” (Catanzarite, col. 3, line 18), but nowhere does it teach or suggest recharging any type of battery or similar source of current. Moreover, Catanzarite clearly does not describe using the controllable seat damper system to power or recharge the battery. Catanzarite does no more than disclose the use of a battery to power the electronics in its controllable seat damper system.

The Applicant also notes that Catanzarite does not disclose a damper controller that includes a battery or other power source.

It can thus be seen that the Catanzarite patent does not disclose (1) a damper controller including a rechargeable power supply or (2) a recharging arrangement in communication with the rechargeable power supply, both of which are recited in claim 21.

The Applicant submits that the Arsem patent does not cure these deficiencies. Arsem describes “an electric shock absorber for automobiles . . . which converts the mechanical energy supplied to the shock absorber to electricity for charging a battery.” Arsem, col. 1, lines 11-13. Arsem further describes that “shock absorbers may be electromechanical units, using adaptations of . . . piezoelectric generators.” Arsem, col. 1, line 69 to col. 2, line 1. The specific form of a mechanism using a piezoelectric generator is not disclosed in the Arsem patent. The only other mention of a piezoelectric approach is at col. 3, lines 31-33, where a broad statement is made that “other types of electric generators, such as piezoelectric devices, could be used.”

Arsem does not disclose a powered damping system, let alone a self-powered damping system. At most, Arsem discloses a shock absorber that can generate electricity.

¹ The Examiner makes a similar reference later in the Office Action when suggesting “incorporating the piezoelectric generator structure of Arsem into the recharging arrangement of Catanzarite.” Office Action, at 8.

In the two detailed embodiments, electromechanical units having rotors and stators are used to convert vibratory motion to electricity. Arsem notes that the circuitry in the control unit may be designed “to vary the load applied to the shock absorber, and hence to control the stiffness of the ride.” The Applicant submits that this statement can apply only to Arsem’s electromechanical generators. It clearly would not apply if the electromechanical generators were replaced by a piezoelectric generator.

It can be seen that if a piezoelectric generator is used in the Arsem system, there is no relationship between the piezoelectric generator and the damping of the shock absorber. Thus, the Arsem patent discloses no more than the possibility that a piezoelectric generator could be attached to a shock absorber. The Arsem patent does not disclose a damper controller including a rechargeable power supply in communication with a recharging arrangement comprising a piezoelectric generator.

Based on the above, it can be seen that the combined Catanzarite and Arsem references fail to teach, disclose or suggest an isolation system that comprises an MR damper, a damper controller including a rechargeable power supply in communication with a recharging arrangement comprising a piezoelectric generator as recited in Claim 21. Further, the Catanzarite and Arsem patents do not include the requisite suggestion or motivation to combine their respective teachings. Catanzarite makes no mention of a recharging arrangement. There is thus no motivation to look to other sources for a particular form of recharging arrangement.

Additionally, no reasonable expectation of success is found in either reference. Catanzarite claims to “provide a continuous control of the output force of the damper system over a significant range,” Catanzarite, col. 1, lines 32-33, and provides no indication of the effect that introducing a piezoelectric generator would have on this control system. Likewise, Arsem claims to convert “mechanical energy supplied to the shock absorber to electricity” (Arsem, col. 1, lines 12-13), and provides no indication of the effect that introducing an air spring and a controllable fluid damper would have on this energy conversion system. A reasonable expectation of success is not found in either reference, but rather is only based on the Applicant’s disclosure.

For at least the above reasons, the Applicant respectfully submits that Claim 21 is patentable over the combined teachings of Catanzarite and Arsem.

Claim 29, similarly to claim 21, recites a “self-powered semi-active damping system comprising: a semi-active damper . . . ; a damper controller . . . ; a rechargeable power supply . . . ; and a recharging arrangement . . . comprising a piezoelectric generator.” Thus, for at least the same reasons as argued above for claim 21, claim 29 is patentable over the combined teachings of Catanzarite and Arsem.

Based on the above, the Applicant respectfully requests that the rejection of claims 21 and 29 under 35 U.S.C. § 103(a) be withdrawn.

B. Claims 22-24, 30, 34, and 35

Claims 22-24 depend on Claim 21, and Claims 30, 34, and 35 depend on Claim 29. Because claims 21 and 29 have been shown to be patentable over the Catanzarite and Arsem patents, the Applicant respectfully submits that claims 22-24, 30, 34, and 35 are also patentable over these patents. The Applicant therefore respectfully requests that the rejection of Claims 22-24, 30, 34, and 35 under 35 U.S.C. § 103(a) be withdrawn.

II. Paragraph 4 Rejection of Claims 26-28

Claims 26-28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Catanzarite in view of Arsem and further in view of Ravizza, U.S. Patent No. 4,080,636 (“Ravizza”). The Applicant respectfully traverses this rejection.

Claims 26-28 depend on claim 21, and thus, for at least the aforementioned reasons, are patentable over the combined teachings of Catanzarite and Arsem. The Applicant submits that the Ravizza patent does not cure the deficiencies of the Catanzarite and Arsem patents with respect to claim 21. The Ravizza patent was cited for its teachings with respect to a particular form of a piezoelectric generator. It does not discuss the use of such a generator in conjunction with an isolation or damping system.

The Applicant thus submits that claim 21 is patentable over the combined teachings of Catanzarite, Arsem and Ravizza. Because claims 26-28 are dependent on claim 21, claims 26-28 are also patentable over the combined teachings of these references. The

Applicant therefore respectfully requests that the rejection of Claims 26-28 under 35 U.S.C. § 103(a) be withdrawn.

III. Paragraph 5 Objection to Claim 25

Claim 25 stands objected to as being dependent upon a rejected base claim. The Applicant appreciates the Examiner's acknowledgement that claim 25 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The Applicant submits, however, that the rejection of claim 21 should be withdrawn, which would remove the basis for the objection to claim 25. The Applicant therefore respectfully requests that the objection to claim 25 be withdrawn.

IV. Conclusion

For at least the above reasons, the Applicant respectfully submits that claims 21-30, 34, and 35 are in condition for allowance. The Applicant therefore requests that the present application be allowed and passed to issue.

Should the Examiner believe anything further is desirable in order to place the Application in even better condition for allowance, the Examiner is invited to contact the Applicant's undersigned representative.

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